

REMARKS

With entry of the instant amendment claims 30 – 52 are pending. Original claims 1 – 29 have been canceled without prejudice and Applicants reserve the right to file further continuation applications on the subject matter of any canceled claim.

Pending claims 30, 43 and 48 are independent claims. Claim 30 recites a method for producing an end-product comprising the steps of a) contacting a cellulose or starch containing substrate and at least one substrate-converting enzyme to produce an intermediate selected from the group of pentoses and hexoses, wherein said substrate-converting enzyme is selected from the group consisting of alpha amylases, glucoamylases, pullulanases and combinations thereof; and b) contacting said intermediate with an intermediate-converting microbial enzyme, wherein said intermediate is substantially all converted by said intermediate-converting microbial enzyme to said end-product. The claim finds support in at least original claims 1, 2, 4, 11, and 12 and at pages 9, lines 28 – 33; 13, lines 9 – 11; and 22, lines 10 – 12 of the disclosure.

Claims 31 – 42 depend from claim 30. More specifically, claim 31 is directed to cellulose or starch containing substrates obtained from corn or wheat plant material, and support is found at pages 10 and 21 of the disclosure. Claim 32 recites that the glucoamylase is a granular starch hydrolyzing enzyme and claim 33 further defines the starch hydrolyzing enzyme as derived from a strain of *Humicola* or *Rhizopus*. Support is found at pages 23 and 24 of the disclosure. Claim 34 further defines the alpha amylase as derived from a bacterial source and support is found at page 22, lines 28 – 32 of the disclosure. Claim 35, which recites that the intermediate-converting microbial enzyme is secreted by a microorganism in contact with said intermediate, finds support in original claim 3, and claim 36, which recites that microorganism is bacterial finds support at pages 22 and 28. Claim 37, which recites that the intermediate is maintained as a concentration level below that which triggers catabolic repression effects upon the conversion of said intermediate to said end-product and claim 38 which recites that the intermediate is maintained at a concentration level below that which triggers enzymatic inhibition effects upon the conversion of said intermediate to said end-product, find support in original claims 8 and 9, respectively. Claim 39, which recites that the presence of the end-product does not inhibit the further production of the end-product, finds support in original claim 15. Claim 40, which recites that the presence of the cellulose or starch containing substrate does not inhibit the further production of the end-product, finds support in original claim 23. Claim 41 defines the hexose as glucose and finds support in original

claim 13. Claim 42 lists preferred end-products and finds support in the examples and original claim 14.

Independent claim 43 is directed to a method for producing an end-product comprising the steps of a) contacting a cellulose or starch containing substrate and a glucoamylase to produce glucose; and b) contacting the glucose with at least one intermediate-converting microbial enzyme, wherein the presence of said end-product does not inhibit the further production of said end-product. Support is found at least in original claims 16 and 17 and at pages 9, lines 28 – 33; 13, lines 9 – 11; and 22, lines 10 – 12 of the disclosure.

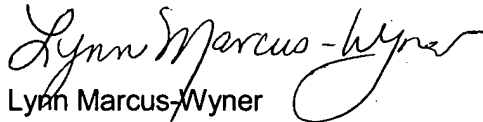
Claims 44 – 47 depend from claim 43. More specifically, claim 44 is directed to corn or wheat as a starch containing substrate, and support is found at pages 10 and 21 of the disclosure. Claim 45 defines the glucoamylase as a granular starch hydrolyzing enzyme, and support is found at pages 23 and 24 of the disclosure. Claim 46 defines the intermediate-converting microbial enzyme as an enzyme secreted by a microorganism in contact with the glucose, and support is found in original claim 18. Claim 47 recites preferred end-product produced according to the method and support is found in the examples.

Independent claim 48 is directed to a method for producing an end-product in a bioreactor from a starch substrate comprising, a) contacting a granular starch substrate and a granular starch hydrolyzing enzyme in a bioreactor to produce glucose; and b) contacting the glucose with an intermediate-converting microbial enzyme to obtain an end-product, wherein said end-product is selected from the group consisting of 1,3-propanediol, gluconic acid, glycerol, succinic acid, lactic acid, 2,5-diketo-D-gluconic acid, alcohol, and ascorbic acid intermediates. Support is found at least in original claims 1, 2, 4, 11, 12, 13 and 14; in the examples and at page 13, line 12 and page 21, lines 15 – 19 of the disclosure.

Claims 49 – 52 depend from claim 48. More specifically, claim 49 defines the starch substrate as corn or wheat and support is found at page 21, lines 8 – 10 of the disclosure. Claim 50 defines the intermediate-converting microbial enzyme as an enzyme secreted by a microorganism in contact with the glucose, and support is found in original claims 5, 18 and 27. Claim 51 defines the starch hydrolyzing enzyme as derived from a strain of *Rhizopus* or *Humicola*, and support is found at page 24 of the disclosure. Claim 52 recites that the granular starch substrate and granular starch hydrolyzing enzyme are also contacted with an alpha amylase to produce the glucose, and support is found in the examples and at page 22, lines 10 – 12 and lines 24 - 35.

Applicants believe claims 30 - 52 are in condition for allowance and an early allowance is kindly requested.

Respectfully submitted,



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